Mr. Neal Maxymillian, Vice President
Maxymillian Technologies, Inc.
84 State Street
Boston, Massachusetts 02109

Dear Mr. Maxymillian

By this letter and enclosure, the National Program Chemicals Division (NPCD) of the U.S. Environmental Protection Agency (EPA) grants Maxymillian Technologies, Inc. (Maxymillian) an approval to demonstrate its mobile polychlorinated biphenyl (PCB) alternate thermal disposal method (Enclosure). This approval authorizes Maxymillian to remove and dispose of PCBs from soil during a demonstration for an amendment to the Maxymillian nationwide PCB Disposal approval. Specifically, Maxymillian may operate its mobile Maxymillian Indirect System (IDS) to process non-liquid PCBs at the Fairground Avenue Stockpile Remediation site, located in North Adams, Massachusetts. The Massachusetts Department of Environmental Protection (MA DEP) has oversight responsibilities for the site remediation. Effective dates for this approval are March 14, 1999 to April 30, 1999.

The Maxymillian PCB Disposal Demonstration shall consist of two phases, the start up phase (Shakedown period) and the Demonstration phase. During the start up phase at the North Adams site, Maxymillian plans to use soil containing greater than 50 ppm PCBs. Preparatory to the Demonstration, Maxymillian shall treat soil containing PCB at approximately the concentration to be demonstrated, to ensure optimal operating conditions. EPA limits the quantity of PCB-contaminated soil to 200 cubic yards throughout the start up phase. During the Demonstration, samples of the soil shall be collected and analyzed to ensure that the soil is treated to less than 2 parts per million (< 2 ppm) PCBs. Treated process water shall be collected and analyzed to ensure acceptable treatment level of less than 3 parts per billion (<3 ppb) PCBs.

Maxymillian shall perform three test runs during the PCB Disposal Demonstration. The company shall sample exhaust emissions during two of the test runs. Any approval that EPA issues to Maxymillian will include a condition for maximum PCB concentration in the waste feed material. EPA will base this condition on the average PCB concentration in the waste feed material disposed during the two demonstration runs for which stack emissions monitoring is successfully completed.

To comply with the PCB regulations pursuant to 40 CFR 761.70, Maxymillian must monitor the exhaust emission for PCBs during the Demonstration. Maxymillian shall sample the

CONCURRENCES								
SYMBOL	7404	7404						
SURNAME	Dodohara	Bay						
DATE	3/16/99	3/17/99						

U.S. GOVERNMENT PRINTING OFFICE: 1997 516-124

exhaust for PCBs and PCDDs/PCDFs. Requirements for monitoring the exhaust for particulate matter, HCl, and volatile and semi-volatile organic compounds have been omitted because results from past Indirect System test operations indicate insignificant levels of these materials in the exhaust. Moreover, EPA believes that the Maxymillian IDS system, an alternative disposal technology, minimizes the formation of products such as HCl and volatile and semi-volatile organic compounds which are usually related to the incineration of PCBs and hazardous wastes.

Maxymillian shall provide splits of representative samples of feedstock for analysis by NPCD from all test runs during the demonstration phase. NPCD shall impose, as conditions in the nationwide permit, the types of PCB-containing material which can be treated as well as PCB concentration in soil. These conditions will be based on operating conditions observed during the demonstration phase. In addition, such operating conditions shall include but not be limited to soil exit temperature, waste feed rate, and waste feed concentration.

After completing the PCB Disposal Demonstration, Maxymillian may continue operations at a feed rate of total PCBs commensurate with conditions in their nationwide TSCA approval dated September 1, 1998. Condition 2 of the approval restricts the feed rate to 12.5 tons per hour of soil containing less than 700 ppm PCBs maximum. This total PCB feed rate is equivalent to 17.5 pound per hour of pure PCBs. Maxymillian may treat soil at a total PCB rate not to exceed 17.5 pounds per hour.

Interim operations under this approval shall commence on verbal approval by EPA upon presentation of acceptable soil treatment result (< 2.00 ppm PCBs). Upon approval, Maxymillian may treat soil containing the lowest concentration of PCBs at the site at a feed rate of 12.5 tons per hour (approximately 1000 ppm PCBs), for a period no to exceed seven calendar days. Maxymillian may continue with a second phase of the interim operation upon presentation for approval by EPA, acceptable PCB emissions, i.e., 99.9999% destruction and removal efficiency, The EPA approval will be verbal, followed by written approval by the Chief, Fibers and Organics Branch. The second phase shall maintain no PCB concentration restrictions at feed rates up to 12.5 tons per hour and shall continue for a period not to exceed seven days. Maxymillian may continue operations to termination of the remedial activities at the North Adams site upon presentation and approval of the PCDD/PCDF emissions. The exhaust gas may not exceed one (1) ng/m^3 TEQ of 2,3,7,8 tetrachlorodibenzodioxin concentration. Condition 9 provides details of this emission requirement.

The Maxymillian IDS process is described in documents for a TSCA PCB disposal demonstration tests and operating permit submitted to NPCD entitled "Operating Permit Application" on December 15, 1996, updated July 11, 1997 and "Demonstration Test Plan" dated July 11, 1997.

EPA representatives and their contractor will be on site during the demonstration phase to observe procedures and to verify the results of the test runs. Maxymillian shall perform at least three complete test runs for the scheduled demonstration phase.

Quality Assurance (QA) spiked PCBs or Aroclor samples may be submitted by EPA

representatives to the laboratory to be designated by Maxymillian to conduct chemical analyses of samples collected at the demonstration phase, or to other entities selected by Maxymillian to conduct chemical analyses of samples from the demonstration phase. Maxymillian must determine the PCB concentration of each sample using analytical instrumentation in its designated laboratory(s).

After the demonstration phase, Maxymillian will collect and assemble all test results into a Process Demonstration Test Report (Enclosure) and submit the results to the NPCD, for evaluation. When the evaluation is complete, and if the data are determined to be acceptable, EPA will issue Maxymillian Technologies, Inc. an amendment to the nationwide PCB disposal approval to treat soils containing the concentration of PCBs successfully destroyed in this Maxynillian PCB Disposal Demonstration.

Maxymillian may claim any information submitted to be confidential business information in accordance with EPA regulations at 40 CFR §2.203(b). Such information must be clearly marked "Confidential", and Maxymillian must also submit a sanitized version of the information at the time the claim of confidentiality is made. Failure to assert a claim of confidentiality shall constitute a waiver, and any information submitted may be released without prior notice to Maxymillian.

The nationwide approval contains financial assurance requirements similar to the requirements at 40 CFR Part 264 (Subpart H), applicable to the Maxymillian IDS processing equipment and to the operating arena but not applicable to the Remediation site. Maxymillian must file documentation of compliance with these requirements with NPCD prior to initiation of any commercial operations disposing of waste regulated for disposal under the Toxic Substances Control Act.

If you have any questions regarding this matter, please contact Hiroshi Dodohara at (202) 260-3959.

Sincerely,

John W. Melone, Director
National Program Chemicals Division

Enclosures

cc: Kim Tisa
USEPA, Region I

Cathy Wanat
Massachusetts DEP

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Approval to Demonstrate the Dispose of Polychlorinated Biphenyls (PCBs)

COMPANY

Maxymillian Technologies, Inc.
84 State Street
Boston, Massachusetts 02109

Headquarters
Maxymillian Technologies, Inc.
1801 East Street
Pittsfield, Massachusetts 01201

APPROVAL TYPE

Demonstration Test

EFFECTIVE DATE

March 14, 1999 through April 30, 1999.

AUTHORITY

This approval to perform a demonstration test for PCB disposal is issued pursuant to Section 6(e)(1) of the Toxic Substances Control Act of 1976, Public Law No. 94-469, and the Federal PCB Regulations, 40 CFR Part 761.60(e), (48 Federal Register, 13185, March 30, 1983).

CONDITIONS OF APPROVAL

1. Advance Notification: A thirty-day advance notification of the Demonstration Test must be provided to the EPA Regional Administrator and the State and local officials where the Maxymillian Indirect System mobile unit will be used. This notice must include the exact site, date, and entity using the process along with an estimate of the length of stay at the site. A copy of the notice shall be submitted to EPA Headquarters.

2. Feedstock Restrictions: The Maxymillian IDS mobile unit shall be used to treat non-liquid PCBs. The quantity of PCBs to be processed will be limited to that required to complete the initial Shakedown period and the Demonstration Test.

For the start up phase (Shakedown period), EPA limits the quantity of PCB-contaminated soil to 200 cubic yards. For the Shakedown operations, leading to the PCB Disposal Demonstration phase, Maxymillian shall process soil containing greater than 50 ppm PCBs. To prepare for the Demonstration, Maxymillian shall treat soil containing PCB at approximately the concentration to be demonstrated.

Prior to treatment, the PCBs must be characterized for Aroclor type and concentration. The PCBs must be sampled and analyzed by gas chromatography for PCBs in accordance with the Maxymillian demonstration plan and procedures published by EPA:

"Guidelines for PCB Destruction Permit Applications and Demonstration Test Plans for PCB Incinerators,"
May 28, 1986;

Quality Assurance and Quality Control Procedures for Demonstrating PCB Destruction in Filing for an EPA Disposal Permit," USEPA, June 28, 1983 (Draft);

"Recommended Analytical Requirements for PCB Data Generated On Site During Non-Thermal PCB Destruction Tests", USEPA, March 19, 1986 (Draft); and

"Interim Guidelines and Specifications for Preparing Quality Assurance Plans", QAMS-005/80, Office of Research and Development, USEPA, December 29, 1980.

Authorized EPA representatives must witness this demonstration and obtain appropriate split samples for verification of analytical results. Maxymillian may conduct whatever additional analyses are necessary to characterize the waste feed and facilitate more efficient pyrolysis (i.e., chloride content, ash content and heat of combustion/formation).

Maxymillian may dilute or add PCBs to the waste feed in order to achieve an appropriate PCB concentration for demonstration purposes.

3. EPA Laboratory Audit: EPA may provide samples of PCBs in test matrices in order to test the adequacy of analytical methods employed by Maxymillian or its agent. EPA will inform Maxymillian of the approximate range of PCB concentration and the identity of the test matrix, if such samples are provided. Maxymillian or its agent must determine the concentration of the test material during the regular Demonstration period, and provide EPA with all chromatogram, calculations, and records regarding analysis. EPA personnel may observe all or any portion of the analytical procedures.

4. Process Restrictions: The Maxymillian IDS mobile unit shall operate following conditions delineated in the nationwide PCB Disposal approval dated September 11,1998.

5. Exhaust Emissions Monitoring: Monitoring of the exhaust emission shall be conducted only during sampling operations for the following parameters:

a. Oxygen, O_2 (continuous)
b. Carbon monoxide, CO (continuous)
c. Carbon dioxide, CO_2 (continuous)
d. Hydrochloric acid, HCl; not required.
e. PCBs
   - Samples of the exhaust gas shall be collected and analyzed for PCBs during two run of the PCB Disposal Demonstration.
f. Total particulate matter; not required
g. PCDDs and PCDFs
   - Samples of the exhaust gas shall be collected and analyzed for PCDDs and PCDFs during two test runs of the PCB Disposal Demonstration. At minimum, analysis for the following shall be performed:
   - 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzofurans
   - total tetrachlorodibenzo-p-dioxin and tetrachloro-dibenzofuran
   - total polychlorodibenzodioxins and polychloro-dibenzofurans
h. Volatile and Semi-Volatile Organics; not required

Emissions of PCBs, PCDD and PCDF must be reported in emission rate and in concentrations.

6. Process Waste Characterization: Liquid waste from the water treatment system must be analyzed for PCBs. All process solid waste exhibiting a level of PCB above 2 ppm * chromatographic peak and aqueous waste above 3 ppb PCBs must be disposed of as if it contained the PCB level of the feedstock. Sampling of the solid and liquid wastes should be performed at the termination of the demonstration tests, or when the solid or liquid media is replaced or replenished, whichever occurs first.

7. Pollution Control Equipment: An induced draft system captures the gas discharge from the IDS, exposing the gas to a quench system and a filtration unit. The pollution control system shall be operated whenever PCBs are being treated. Maxymillian shall not dispose of the quench effluent prior to analysis of fluid samples for PCBs. Maxymillian must comply with all Federal, State and local regulations.

Quench effluent exhibiting PCBs over 3 ppb per peak must be disposed of in an EPA-approved incinerator or an EPA-approved alternate treatment process.

8. Successful Trial Runs: A minimum of three successful trial test runs must be completed. Successful trial run is defined as one in which operations were continuous without significant

interruptions and one in which sampling of the exhaust emission was representative and adequate to achieve removal of PCB to a 99.9999% level in the exhaust emissions, and all "products" to be below 2 ppm PCBs for solids and below 3 ppb for aqueous fluids. PCB analysis showing Aroclor patterns shall be reported as total PCBs, otherwise, the results will be reported for individual PCB congener peaks.

9. Interim Operations: Maxymillian may continue operations after the PCB Disposal Demonstration Tests at a feed rate determined by Condition 2 of their nationwide TSCA approval dated September 1, 1998. The approved feed rate is 12.5 tons per hour of soil containing 700 ppm PCBs or 17.5 pounds per hour of pure PCBs. Without interim operation authorization, Maxymillian shall not exceed a feed rate of 17.5 pounds per hour PCBs.

To grant interim operation authorization, EPA must determine that the Maxymillian IDS thermal desorption unit poses no unreasonable risk of injury health or the environment. Specifically, EPA must determine that the IDS is equivalent to a TSCA PCB incinerator as defined in 40 CFR 761.70.

To proceed with Phase 1 below, Maxymillian shall submit data to confirm that the IDS has treated soil to the acceptable level of below 2 ppm PCBs. Phase 1 approval will be verbal and authorizes Maxymillian to treat soil containing the lowest PCB concentrations (about 1000 ppm) at the site, at 12.5 tons per hour.

Phase 2 requires that the IDS meets the destruction and removal efficiency (DRE) standards for a PCB incinerator. When Maxymillian demonstrates that the parameters meet the criteria, EPA will authorize verbally followed in writing, an additional period of operation not to exceed seven days. The approval shall be signed by the Chief, Fibers and Organics Branch authorizing removal of the PCB concentration limit for the site.

To complete the Remediation of the site under Phase 3, Maxymillian must present for EPA approval, PCDD/PCDF emission data. The exhaust gas may not exceed one (1) ng/m^3 TEQ of 2,3,7,8 tetrachlorodibenzodioxin concentration. The authorization will be verbal, followed by approval by the Chief, FOB, in writing. The interim operations procedure is summarized below.

Phase	Parameters	Criteria	Authorized Duration of Interim Operations After Completion of Demonstration Tests	Cumulative Total Weeks of Interim Operations
PCB Demonstration Test Data				
(1)	PCB in Treated Soil	< 2 ppm PCBs	seven days	one week
(2)	PCB emissions	99.9999% removal	seven days	two weeks
(3)	PCDD TEF emissions	< 1 ng/m^3 *	four weeks	ten weeks

11. Secondary Containment Restrictions: If liquid PCBs are to be handled on site, secondary containment system for the processing area will be installed to ensure inadvertent releases of PCBs and PCB-related hazardous waste into the environment do not occur. All fluids accumulating in the process area containment shall be sampled and analyzed for PCBs and must meet the SPDES effluent limits prior to discharge.

12. Recordkeeping and Operations Log: Maxymillian shall collect and maintain for a period of five years from the date of the demonstration, the following information:

A. Continuous and short interval data described below:

1) Quantity of PCBs Treated;

2) Exhaust emissions, including oxygen, carbon monoxide and carbon dioxide.

B. Data and records on the monitoring of exhaust emissions as required by these conditions.

C. The total weight in kilograms of any solid residues generated by the treatment of PCBs during the demonstration, and the total weight in kilograms of any solid residues disposed of.

D. The name and address of each client whose PCB waste was processed by the IDS unit.

E. The type and amount of PCBs and other raw materials treated.

F. A copy of each gas chromatogram from the tests required by Condition 2.

G. The date(s), time and duration of the demonstration.

H. The name, address and telephone number of the operator and supervisor.

The documents must be compiled within 60 days following completion of the demonstration, must be kept at one centralized location, and must be available for inspection by authorized representatives of the EPA upon request. Maxymillian or its authorized agents must also maintain the records required by 40 CFR 761.180. If Maxymillian or its agents terminate business, these records or their copies must be submitted to the Director, National Program Chemicals Division, OPPT.

13. Process Failure: If the quality control testing as described in the demonstration plan and the EPA guidelines reveals that the PCBs are not being adequately removed and destroyed, disposal activities may be ordered to cease until adequate explanation is given and corrective measures

are taken. A written report detailing the problem and solution shall be filed with the EPA within five business days.

14. PCB Releases: In the event Maxymillian believes, or has reason to believe, that a release of PCBs has or might have occurred, the facility operator must inform the EPA immediately.

A written report describing the incident must be submitted by the close of business on the next regular business day. No PCBs may be processed in the facility until the release problem has been corrected to the satisfaction of the EPA.

15. PCB Spills: Any spill of PCBs or other oils shall be promptly controlled and cleaned up as provided in Maxymillian's Spill Prevention, Control and Countermeasures Plan. In addition, a written report describing the spill, operations involved and clean-up actions must be submitted to the EPA within five business days.

16. Facility Security and Safety: Maxymillian must take all necessary precautionary measures to ensure that operation of the IDS is conducted in compliance with all applicable safety and health standards, as required by Federal, State, or local regulations and ordinances. The test site shall be secured (e.g., fence, alarm system, etc.) to ensure that only those individuals participating in the demonstration and authorized visitors are allowed in the approved areas.

Any accident or personal injury occurring as a result of the Indirect System unit must be reported to the EPA by the next business day. A written report describing the accident must also be submitted within five business days.

17. Reporting Requirements: Any notification of EPA required by Conditions 11, 12, 13, or 14 shall be submitted by telephone to the PCB Disposal Section (202-382-3964) within the time frame specified. In addition, Maxymillian shall file a written report with the Director of the National Program Chemicals Division, Office of Pollution Prevention and Toxics, 401 M Street, S.W., Washington, D.C. 20460 within the specified time frame.

18. PCB Off-Site Transport: PCB waste may not be transported off-site, except for proper disposal in accordance with 40 CFR 761.60. All PCBs not utilized in the test burn, e.g. spiking solutions, shall upon completion of all testing, be disposed of in accordance with 40 CFR Part 761. PCB-contaminated equipment on the IDS unit may be transported off-site in accordance with the U.S. Department of Transportation (DOT) requirements of 49 CFR Part 172. Such requirements include placarding the IDS unit if the equipment is not decontaminated prior to leaving the site.

19. Severability: The conditions of this approval are severable, and if any provisions of this approval or any application of any provision is held invalid, the remainder of this approval shall not be affected thereby.

20. Other Approvals/Permits: No operation may commence until Maxymillian has obtained all necessary approvals/permits from Federal, State, and local agencies. Maxymillian is responsible for obtaining such approvals/permits where appropriate.

21. Other Regulations: This approval to dispose of PCBs does not relieve Maxymillian of its responsibility to comply with all applicable Federal, State, and local regulations. Violation of any applicable Federal regulations will be subject to enforcement action, which may include termination of this approval. This approval may be rescinded at any time for failure to comply with the terms and conditions herein, or for any other reasons which EPA deems necessary to protect health and the environment.

22. Compliance Responsibility: Maxymillian shall be responsible for any authorized Maxymillian operator and shall assume full responsibility for any failure to comply with all applicable Federal, State, and local laws and regulations, including the conditions of this approval.

23. EPA Inspection: EPA reserves the right for its employees or agents to inspect and test Maxymillian personnel, procedures, and equipment. EPA reserves its right to suspend terminate Maxymillian PCB disposal activities at any time.

24. Deviation from Demonstration Plan: Any deviations from the conditions of this approval or the terms expressed in the application/demonstration test plan from Maxymillian, must receive authorization by EPA. Verbal authorizations by EPA representatives on site must be followed within ten working days by a written modification to the demonstration plan. In this context, "demonstration plan" shall be defined as all data and materials which have been received by this Agency from Maxymillian regarding the Maxymillian IDS mobile process.

25. Demonstration Approval and Conditions: EPA reserves the right to impose additional conditions when it has reason to believe that the continued operation of the Indirect System unit presents an unreasonable risk of injury to health or the environment, or for any other reason it deems valid.

Approval to conduct a disposal demonstration of PCBs is hereby granted to Maxymillian Technologies, Inc. of Boston, Massachusetts, subject to the findings and conditions expressed herein, and consistent with the materials and data included in the permit application and demonstration plan filed by Maxymillian. This approval is valid for operations at the AAG Fairgrounds Avenue Soil Stockpile Remediation Site in North Adams, Massachusetts.

_____ _____

Date

John W. Melone, Director
National Program Chemicals Division

APPENDIX 1

BACKGROUND

Maxymillian Technologies, Inc. (Maxymillian), headquartered in Pittsfield, Massachusetts with a branch office in Boston, Massachusetts, provides commercial hazardous waste Remediation services to public customers using its proprietary Indirect System (IDS). The IDS process uses an alternate technology as a mobile treatment unit for hazardous waste including PCBs. Maxymillian initially submitted their TSCA (Toxic Substances Control Act) R&D Permit Application to the U.S. Environmental Protection Agency (EPA) in 1995, EPA granting the R&D approval later that year. The TSCA Permit Application (operating permit) and Demonstration Test Plans were submitted December 1995. Results of R&D studies and Demonstration Tests are summarized in Appendix 2.

Maxymillian modified the IDS extensively. The company submitted revisions of the TSCA Permit Application and the Demonstration Test Plan on July 11, 1997. The site selected for demonstrating the IDS is a remedial site with oversight responsibilities by the Massachusetts Department of Environmental Protection (MA DEP), the Fairground Avenue Stockpile Remediation site, located in North Adams, Massachusetts. The American Annuities Group in the Potential Responsible Party (PRP). EPA reviewed the "Release Abatement Measure Plan" submitted to the MA DEP dated June 25, 1997.

FINDINGS

1. The Maxymillian Indirect System is a mobile treatment unit to dispose of non-liquid PCBs. The IDS removes PCBs from contaminated soil. Components of the IDS include the following

   a. Material feed system;
   b. Indirectly heated desorber;
   c. Baghouse;
   d. Materials discharge system;
   e. Vapor treatment system; and
   f. Liquid treatment system.

Process Description: The IDS employs a continuous process starting with the loading of contaminated soil into the material feed system. The IDS which uses a rotary desorption chamber which is heated by an indirect source to desorb organic contaminants from soil. Maxymillian claims that a non-oxidative atmosphere is maintained throughout the desorption chamber. The gas stream from the desorber passes through a baghouse where particulate is separated from the gas stream and discharged along with the treated soil from the desorption chamber. The gas stream is quenched, inducing desorbed contaminants to condense and to separate from the gas stream. Water from the quench sump is pumped to the liquid treatment system.

A series of condensers, coalescer, filters and carbon adsorption beds further cleanses the gas stream. As an option, the gas may pass through a catalytic converter destroying light hydrocarbons, then through a condenser, flowing through a polishing carbon bed prior to discharging to the environment. Light hydrocarbons are not adsorbed in carbon beds. The other option is to by-pass the catalytic converter and flow directly through a set of polishing carbon beds prior to discharging to the atmosphere.

Quench sump water and condensate from the gas treatment system combine and are stored in a holding tank. The Liquid Treatment System treats this water though pH adjustment and flocculation. As the water flows through a clarifier, material which settle out are pumped to a filter press. the filtrate is pumped back to the flucculator. Water exiting the clarifier flows through dual particulate filters and finally through polishing carbon adsorption columns. The purified water is pumped to the treated soil discharge system for cooling and remoisturization of the soil.

2. The Maxymillian Indirect System mobile unit is designated as an alternate PCB disposal method or more appropriately, an alternate PCB thermal disposal process. The Maxymillian IDS mobile unit must demonstrate PCB disposal equivalent to a 40 CFR 761.70 incinerator.

3. The Maxymillian IDS must demonstrate to meet or exceed the operating performance criteria for incineration of PCBs under 40 CFR 761.70. Incinerators meeting these criteria have been shown not to present an unreasonable risk to human health or the environment. The currently accepted performance level for EPA-approved incinerators is 99.9999% destruction and removal efficiency (DRE) for PCBs.

4. Many of the IDS unit operating parameters are computer controlled. Should a malfunction occur, the IDS unit is designed to automatically shut down. In addition, a shutdown sequence may be initiated by manual activation.

5. Due to the design aspects, operating parameters, and safety measures, EPA finds that a demonstration of the Maxymillian IDS system is similar to a demonstration of a 40 CFR 761.70 incinerator and that the demonstration does not pose an unreasonable risk of injury to health or the environment.

6. PCDD/PCDF Emissions Criteria: When Maxymillian submitted applications for TSCA PCB R&D and nationwide approvals, the proposed emission standard for PCDD/PCDF by hazardous waste incinerators was at the 1 ng/m^3 level. Since then, several changes have been proposed. Current proposed level (6/30/97) is 0.2 ng/m^3. Because a significant number of facilities exists throughout the country which can be categorized as small incineration facilities, a potential option for separate, parallel standards for small facilities is being considered. The dividing line between small and medium facilities is set at 20,000 acfm. Because the Maxymillian exhaust gas flow is about two orders of magnitude smaller than the dividing line, EPA believes it is premature to impose the current proposed PCDD/PCDF emission standard for hazardous waste incinerators until the options for separate standards for small incinerators are further developed.

APPENDIX II

SUMMARY OF RESULTS
FROM THE MAXYMILLIAN TSCA PCB DISPOSAL DEMONSTRATION
AT THE AAG FAIRGROUNDS AVENUE STOCKPILE SITE
IN NORTH ADAMS, MASSACHUSETTS
September 16 - 19, 1997

OPERATING CONDITIONS

Thermal Desorber Operating Data	RUN 1	RUN 1A	RUN 2	RUN 3	AVG	MIN	MAX	STD[1] DEV
Soil Feed Rate, tons/hr	12.36	12.16	12.43	10.99	12.3*	6.18	14.93	1.14
Soil Exit Temperature °F	712	696	708	739	714	577	878	60
Thermal Desorber Face Pressure, in. w.c.	-0.41	-0.44	-0.43	-0.45	-0.43	-0.73	-0.11	0.11
Quench Water pH	7.4	6.2	6.5	6.8	6.7	4.6	8.1	0.21
Vapor Phase Carbon Vessel, Range of Relative Humidity, %		0.05-6.0	< 1-1	0.05-6.0				
Stack Gas Flow Rate, acfm	--	250	227	251				

*Average of Runs 1A & 2, the two highest accepted test runs, to be applied to permit condition.
[1]Average over four test runs.

PCBs DRE

Soil PCB Level, ppm (Maxymillian)	--	847	418	506	677*
Soil Feed Rate, tons/hr	12.36	12.16	12.43	10.99	
Total PCB Flow Rate, lb/hr	--	20.6	10.4	11.1	
PCB Stack Emissions, gm/sec	--	2.310E-08	3.69E-09	1.46E-08	
PCB DRE, %	--	99.9999991	99.9999997	99.9999990	

*Average of the two highest PCB concentration from accepted test runs, applied to permit conditions.

Dioxins/Furans

2,3,7,8 TCDD TEQ Exhaust Gas Concentration, ng/dscm	--	< 6.94E-03	< 6.19E-03	< 7.07E-03
2,3,7,8 TCDD TEQ Exhaust Gas Concentration, ng/dscm, corrected to 7% O_2	--	< 5.33E-03	< 4.72E-03	< 5.83E-03
2,3,7,8 TCDD TEQ Exhaust Gas Emission Rate, gm/sec	--	< 7.67E-10	< 6.07E-13	7.87E-13

Process Stream Split Samples, PCB Analysis, EPA Lab, ppm PCBs

	RUN 1	RUN 1A	RUN 2	RUN 3
Soil Feed PCB Concentration, ppm	79	698	724	861
Treated Soil, ppm	< 2	< 2	< 2	< 2
Personnel Protective Equipment, ppm (Tyvex Coverall, Booties, etc.)				24.2

EXHAUST EMISSIONS

Parameters	RUN 1
Carbon Monoxide, ppmv	3.72
Carbon Dioxide, vol %	15.23
Oxygen, vol %	2.47
HCl, lb/hr	< 7.278E-06
Particulate Matter, gr/dscf	0.0021

VOLATILE ORGANICS, mg/dscm

CHLORINATED COMPOUNDS	RUN 1	OSHA TWA PELS	ACGIH TWA PELS & OTHERS
Chloromethane	5.762		
Methylene chloride	0.023	25 ppm	25 ppm
Chloroform	< 0.0005 ND	(C)240	(C)240
Carbon tetrachloride	< 0.0009 ND	10 ppm	25 ppm
Bromodichloromethane	< 0.0006 ND		
Dibromochloromethane	< 0.0005 ND		
Trichlorofluoromethane			
Chloroethane	< 0.0004 ND		
1,1-Dichloroethane	< 0.0005	400	400
1,2-Dichloroethane	< 0.0178	50 ppm	200
1,1,1-Trichloroethane	< 0.0008 ND	1900	1900
1,1,2-Trichloroethane	< 0.0009 ND	45	45
1,1,2,2-Tetrachloroethane	< 0.0008 ND	35	35
Vinyl chloride	< 0.0007 ND	1 ppm	1 ppm
1,1-Dichloroethene	< 0.0309		
1,2-Dichloroethene (total)	< 0.0161		
Trichloroethene	< 0.0005		
Tetrachloroethene	< 0.0005 ND		
1,2-Dichloropropane	< 0.0005 ND	350	350
cis-1,3-Dichloropropene	< 0.0004 ND		
trans-1,3-Dichloropropene	< 0.0004 ND		
Chlorobenzene	< 0.0005 ND	350	350

NON-CHLORINATED COMPOUNDS	RUN 1	OSHA TWA PELS	ACGIH TWA PELS & OTHERS
Acetone	0.0955	2400	2400
2-Butanone	0.0024	590	590
4-Methyl-2-pentanone	< 0.0011 ND		
2-Hexanone	< 0.0018 ND	410	410
Vinyl Acetate			
Carbon disulfide	< 0.0034	20 ppm	60
Bromomethane	< 0.2549		
Bromoform	< 0.0007 ND	5	5
Benzene	0.0037	10 ppm	0.5 ppm
Toluene	< 0.0032	200 ppm	750
Ethylbenzene	0.001	435	435
Styrene	< 0.004	100 ppm	(C)420
Xylene (total)	0.0071	435	435

< = Sum of multi-component concentrations is below detection limit.
ND = Not detected in any tube set or condensate for this run.
(C) designates a ceiling limit. They are to be determined from breathing-zone air samples.
ppm: may be converted to mg/m^3 by the following equation: mg/m^3 = ppm X mol. wt. compound / 24.0 (at standard condition: 68°F and 29.92 psi)

TENTATIVELY IDENTIFIED COMPOUNDS (TICs)[a]

VOCs	Run 1
Chloroacetic Acid	0.001
Chloromethane	0.016
Hexamethylcyclotrisiloxane	0.0003
Octamethylcyclotetrasiloxane	0.0031

TENTATIVELY IDENTIFIED COMPOUNDS (TICs)[a] (cont'd)

1,2-Butadiene	0.0025
1-Butene	0.0359
1-ethyl-4-methylbenzene	0.0004
1-ethyl-3-methylbenzene	0.0003
1-ethyl-2-methylbenzene	0.0009
1,3,5-Trimetylbenzene	0.0007
2,2',4,46,6'-pentamethyl-3-l(sic)	0.0003
2,4-Dimethylpentane	0.00018
2,3-Dimethylpentane	0.00194
2,4,4-Trimethyl-1-pentene	0.0368
2,4,4-Trimethyl-2-pentene	0.0144
2-Methyl-1-propene	0.0528
2-Methyl-2-propenal	0.0005
(e)-4-Octene	0.001
tris(trimethylsilyl)arsenous(sic)	0.0004
Triophene	0.0002

[a]TIC = Compounds not listed in EPA Method 8270

SEMIVOLATILE ORGANICS (MM5), mg/dscm

COMPOUNDS	RUN 1A	OSHA TWA PELS	ACGIH TWA PELS & OTHERS	
Hexachloroethane	<0.00107 ND	10	10	
Hexachlorobutadiene*	<0.00098 ND			
Hexachloropentadiene*	<0.00976 ND			
Acenaphthene	<0.00195 ND			
Acenaphthylene	<0.00156 ND			
Anthracene	<0.00107 ND	[430][1]		
Benz(a)anthracene	<0.00078 ND			
Dibenz(a,h)anthracene	<0.00098 ND			
1,2-Dichlorobenzene	<0.00166 ND	(C)300	(C)300	
1,3-Dichlorobenzene	<0.00146 ND			
1,4-Dichlorobenzene	<0.00146 ND	450	450	
1,2,4-Trichlorobenze	<0.00215 ND	36[2]		
Hexachlorobenzene	<0.00098 ND			
Nitrobenzene	<0.00078 ND	5	5	
3,3'-Dichlorobenzidine	<0.00976 ND	§1910.1007[a]		§1926.1107[a]
2,4-Dinitrotoluene	<0.00107 ND	1.5	1.5	
2,6-Dinitrotoluene	<0.00098 ND	1.5	1.5	
Naphthalene	0.00241	50	50	
2-Chloronaphthalene	<0.00215 ND			
2-Methylnaphthalene	<0.00176 ND	[4360][2]		
Phenanthrene	<0.00059 BJ	[50][3]		
Fluorene	<0.00127 ND			
Fluoranthene	<0.00098 ND	[2000][6]		

[a] No concentration given.

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[1]LD_{50}: mg/kg oral, mouse

[2]TLV: mg/m^3 (Threshold Limit Value)

[3]LD_{50}: mg/kg, oral, mouse

[6]LD_{50}: mg/kg, oral, rat

SEMIVOLATILE ORGANICS (MM5), mg/dscm (cont'd)

COMPOUNDS	RUN 1A	OSHA TWA PELS	ACGIH TWA PELS & OTHERS
Benzo(b)flouranthenes	<0.00098 ND		
Benzo(k)flouranthenes	<0.00107 ND		
Pyrene	<0.00049 ND	[170][7]	
Benzo(a)pyrene	<0.00078 ND	coal	coal
Indeno(1,2,3-cd)pyrene	<0.00059 ND		
Benzo(g,h,i)perylene	<0.00068 ND		
Chrysene	<0.00049 ND	coal	200[1]
Dibenzofuran	<0.00976 ND		
Isophoronem	<0.00098 ND	140	140
Butyl benzylphthalate	<0.00127 ND	[2330][2]	
Diethyl phthalate	0.00095	5[4]	
Dimethyl phthalate	<0.00068 ND	5	5
Di-n-butyl phthalate	0.00193	5	5
Di-n-octyl phthalate	<0.00127 ND	[6513][5]	
bis(2-Ethyhexyl)phthalate	<0.00293 ND	5	5
Benzoic acid	<0.0000 ND	[2530][10]	
Benzyl alcohol	<0.0000 ND	[4354][12]	
Carbazole*	<0.00029 ND		
2,2'-Oxybis(1-chloropropane)	<0.0000 ND		
4-Bromophenyl phenyl ether	<0.00156 ND		
bis(2-Chloroethyl)ether	<0.00078 ND		
bis(2-Chloroisopropyl)ether	<0.00107 ND		
4-Chlorophenyl phenyl ether	<0.00176 ND		
bis(2-Chloroethoxy)methane	<0.00117 ND		
Phenol	0.00463	19	19
4-Chloro-3-methylphenol	<0.00137 ND		
2-Chlorophenol	<0.00049 ND		
2-Methyl phenol	<0.00117 ND	22[13]	
3/4-Methyl phenol	<0.00156 ND	22[14]	
2,4 Dichlorophenol	<0.00117 ND	[580][2]	
Pentachlorophenol	<0.00146 ND	0.5	0.5
2,4,5-Trichlorophenol	<0.00166 ND		
2,4,6-Trichlorophenol	<0.00117 ND		
2-Nitrophenol	<0.00117 ND		
4-Nitrophenol	<0.00976 ND		
2,4-Dinitrophenol	<0.00976 ND		
4,6-Dinitro-2-methylphenol	<0.00117 ND		

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[7] LC_{50}: mg/m^3, rat

[2] LD_{50}: mg/kg, oral. rat

[4] TLV: mg/m^3 (Threshold Limit Value)

[5] LD_{50}: mg/kg, oral, mouse

[12] LC_{lo}: mg/m^3 rat

[13] PEL for skin exposure

[14] PEL for skin exposure

SEMIVOLATILE ORGANICS (MM5), mg/dscm (cont'd)

2,4-Dimethylphenol	< 0.00976 ND		
4-Chloroaniline	< 0.00976 ND		
2-Nitroaniline	< 0.00976 ND		
3-Nitroaniline	< 0.00976 ND		
4-Nitroaniline	< 0.00976 ND	6	6
N-Nitrosodiphenylamine	< 0.00341 ND		
N-Nitroso-di-n-propylamine	< 0.00107 ND		

DIOXINS/FURANS

	Run 1A			Run 2			Run 3		
PCDDs,	Concentration ng/dscm	TEQs ng/dscm	TEQ Emission Rate, g/s	Concentration ng/dscm	TEQs ng/dscm	TEQ Emission Rate, g/s	Concentration ng/dscm	TEQs ng/dscm	TEQ Emission Rate, g/s
2,3,7,8-TCDD	2.68E-03	2.68E-03	2.96E-13	3.44E-03	3.44E-03	3.38E-13	3.22E-03	3.22E-03	3.59E-13
Other TCDD	7.81E-03			4.59E-03			3.22E-03		
Total TCDD	1.05E-02			8.04E-03			6.45E-03		
1,2,3,7,8-PeCDD	<8.90E-04 ND	<4.45E-04	<4.92E-14	<1.23E-03 ND	<5.60E-04	<5.50E-14	<6.82E-04 ND	<3.41E-04	<3.80E-14
Other PeCDD	0.00E+00			0.00E+00			0.00E+00		
Total PeCDD	<8.90E-04 ND			<1.12E-03 ND			<6.82E-04 ND		
1,2,3,4,7,8-HxCDD	4.88E-03	4.88E-04	5.39E-14	4.88E-03	4.88E-04	4.79E=14	3.97E-03	3.97E-04	4.42E-14
1,2,3,6,7,8-HxCDD	<8.78E-04 ND	<8.78E-05	<9.70E-15	<1.35E-03 ND	<1.35E-04	<1.32E-14	<7.19E-04	<7.19E-05	<8.01E-15
1,2,3,7,8,9-HxCDD	<1.11E-03 ND	<1.11E-04	<1.23E-14	<9.76E-04 ND	<9.76E-05	<9.58E-15	<8.93E-04	<8.93E-05	<9.95E-15
Other HxCDD	0.00E+00			0.00E+00			0.00E+00		
Total HxCDD	4.15E-03			4.31E-03			3.47E-03		
1,2,3,4,6,7,8-HpCDD	3.17E-03	3.17E-05	3.50E-15	3.61E-03	3.61E-05	3.10E-15	1.71E-03	1.71E-05	1.91E-15
Other HpCDD	2.93E-03			0.00E+00			0.00E+00		
Total HpCDD	6.10E-03			3.16E-03			1.71E-03		
OCDD	9.76E-03	9.76E-6	1.08E-15	6.32E-03	6.32E-06	6.20E-16	4.96E-03	4.96E-06	5.53E-16
Total PCDDs	<3.23E-02	<3.86E-03	<4.26E-13	<2.41E-02	<4.76E-03	<4.68E-13	<1.08E-02	<4.15E-03	<4.62E-13
PCDFs									
2,3,7,8-TCDF	1.51E-02	1.51E-03	1.67E-13	4.88E-03	4.88E-04	4.79E-14	1.61E-02	1.61E-03	1.80E-13
Other TCDF	3.37E-02			1.44E-02			6.57E-02		
Total TCDF	4.88E-02			1.92E-02			8.18E-02		
1,2,3,7,8-PeCDF	2.44E-03	1.22E-04	1.35E-14	<8.18E-04 ND			<1.36E-04 ND	<6.82E-06	<7.60E-16
2,3,4,7,8-PeCDF	2.22E-03			1.18E-03	5.88E-04	5.78E-14	1.96E-03	9.80E-04	1.09E-13
Other PeCDF	8.03E-03			3.79E03			8.43E-03		
Total PeCDF	1.27E-02			6.60E-03			1.07E-02		
1,2,3,4,7,8-HxCDF	1.44E-03	1.44E-04	1.59E-14	<6.60E-04 ND	<6.60E-05	<6.48E-15	1.12E-03	1.12E-04	1.24E-14
1,2,3,6,7,8-HxCDF	<4.02E-04 ND	<4.02E-05	<4.45E-15	<5.17E-04 ND	<5.17E-05	<5.07E-15	7.94E-04	7.94E-05	8.84E-15
2,3,4,6,7,8-HxCDF	<5.73E-04 ND	<5.73E-05	<6.33E-15	<7.18E-04 ND	<7.18E-05	<7.05E-15	<5.33E-04 ND	<5.33E-05	<5.94E-15
1,2,3,7,8,9-HxCDF	<5.85E-04 ND	<5.85E-05	<6.47E-15	<7.32E-04 ND	<7.32E-05	<7.19E-15	<5.46E-04 ND	<5.46E-05	<6.08E-15
Other HxCDF	0.00E+00			0.00E+00			0.00E+00		
Total HxCDF	2.93E-03			<6.46E-04 ND			3.22E-03		
1,2,3,4,6,7,8-HpCDF	<1.83E-03 ND	<1.83E-05	<2.09E-15	<1.87E-03 ND	<1.87E-05	<1.83E-15	<1.14E-03 ND	<1.14E-05	<1.27E-15
1,2,3,4,6,7,8-HpCDF	<2.07E-03 ND	<2.07E-05	<2.29E-15	<2.15E-03 ND	<2.15E-05	<2.11E-15	<1.36E-03 ND	<1.36E-05	<1.52E-15
Other HpCDF	0.00E+00			0.00E+00			0.00E+00		
Total HpCDF	<1.95E-03 ND			<2.01E-03 ND			<1.23E-03		
OCDF	2.93E-03	2.93E-06	3.23E-16	<2.15E-03 ND	<2.15E-06	<2.11E-15	<8.80E-04 ND	<8.80E-07	<9.81E-17
Total PCDFs	<7.12E-02	<3.09E-03	<3.41E-13	<3.55E-02	1.42E-03	<1.40E-13	<1.18E-01	<7.07E-03	<3.26E-13
Total PCDD/PCDF	**<1.03E-01**	**<6.94E-03**	**<7.67E-1**	**<5.95E-02**	**<6.19E-03**	**<6.07E-13**	**<1.18E-01**	**<7.07E-03**	**<7.87E-13**

SUMMARY OF RESULTS
FROM THE MAXYMILLIAN TSCA PCB DISPOSAL DEMONSTRATION
AT THE SOUTH GLEN FALLS DRAG STRIP SITE
IN MOREAU, NEW YORK
May 29 - 31, 1996 and August 23, 1996

Background: Maxymillian submitted TSCA (Toxic Substances Control Act) Permit Applications and Demonstration Test Plans on December 6, 1995, and additional submissions on February, 1996, to demonstrate its mobile Indirect Source Thermal Desorption Unit for removing PCBs from soil. The site selected for demonstrating the Indirect System was a remedial site managed by the General Electric Company. The site is located at the South Glens Falls Drag Strip, Moreau, New York.

Maxymillian submitted the "Draft Demonstration Test Plan" and "TSCA PCB Disposal Permit Application" submitted December 15, 1995 and February 15, 1996 for a Toxic Substances Control Act (TSCA) PCB disposal operating permit for the Maxymillian IDS. Results of the demonstration are summarized below.

OPERATING CONDITIONS

Thermal Desorber Operating Data	RUN 1	RUN 2	RUN 3	Post Run
Soil Feed Rate, tons/hr	13.5	12.9	13.5	11.5
Soil Exit Temperature °F	692	650	655	722.7
Thermal Desorber Face Pressure, in. w.c.	-0.23	-0.41	-0.44	-0.44
Flow to Steam Stripping Tower, gpm	0.23	0.24	0.25	0.25
Quench Water pH	7.64	7.47	7.52	7.51
PCBs DRE				
Soil PCB Level, ppm (Maxymillian)	93.2	90.0	99.3	106.0
(EPA Lab)	142[a]	117	106[a]	
Soil Feed Rate, tons/hr	13.5	12.9	13.5	11.5
Total PCB Flow Rate, lb/hr	2.52	2.32	2.68	2.44
PCB Stack Emissions, lb/hr	7.9E-07	5.2E-07	5.6E-07	1.04E-05
PCB Stack Emissions, gm/hr	1.01E-07	6,50E-08	7.11E-07	1.32E-06
PCB DRE	99.99996	99.999978	99.99979	99.999570
PCB DRE Using EPA Lab Soil Results	0.895	1.99	1.08	0.33
Dioxins/Furans				
2,3,7,8 TCDD TEQ Exhaust Gas Concentration, ng/m^3	0.45	0.20	1.7	NA
2,3,7,8 TCDD TEQ Exhaust Gas Emission Rage, gm/sec	< 2.14E-11	< 1.59E-11	< 1.20E-11	NA

OPERATING CONDITIONS: (cont"d)

Process Stream Split Samples, PCB Analysis, EPA Lab, ppm PCBs

	RUN 1	RUN 2	RUN 3	Post Run
Soil Feed PCB Concentration	142[a]	117	106[a]	NA
Treated Soil	< 2	< 2	< 2	NA
Filter Cake, Water Treatment	311 (Pre-Test)		764	NA
Personnel Protective Equipment (Tyvex Coverall, Booties, etc.)			2.0	NA

[a] Average of two analysis.

EXHAUST EMISSIONS

Parameters	RUN 1	RUN 2	RUN 3	Post Run
Total hydrocarbon, ppmv	22,482	20,374	28,147	NA
Carbon Monoxide, ppmv	3.72	3.26	3.01	NA
Carbon Dioxide, vol %	11.78	10.73	14.16	NA
Oxygen, vol %	14.51	12.63	10.37	NA
HCl, lb/hr	2.78E-04	<4.73-04	<3.30E-03	NA
Particulate Matter, gr/dscf	0.0018	<0.0020	<0.0010	NA

VOLATILE ORGANICS, mg/dscm

CHLORINATED COMPOUNDS	RUN 1	RUN 2	RUN 3	OSHA TWA PELS	ACGIH TWA PELS & OTHERS
Chloromethane	< 5.762	< 0.882	<12.791		
Methylene chloride	< 0.0092	< 0.0049	< 0.0009	25 ppm	25 ppm
Chloroform	< 0.0002 ND	< 0.0001 ND	< 0.0002 ND	(C)240	(C)240
Carbon tetrachloride	< 0.0004 ND	< 0.1269	< 0.4120	10 ppm	25 ppm
Bromodichloromethane	< 0.0003 ND	< 0.0001 ND	< 0.0002 ND		
Dibromochloromethane	< 0.0006 ND	< 0.0001 ND	< 0.0003 ND		
Trichlorofluoromethane	< 0.0019	< 0.0013	< 0.0002 ND		
Chloroethane	< 0.0008 ND	< 0.0004 ND	< 0.0006 ND		
1,1-Dichloroethane	< 0.0002 ND	< 0.0001 ND	< 0.0002 ND	400	400
1,2-Dichloroethane	< 0.0002 ND	< 0.0001 ND	< 0.0002 ND	50 ppm	200
1,1,1-Trichloroethane	< 0.0003 ND	< 0.0001 ND	< 0.0002 ND	1900	1900
1,1,2-Trichloroethane	< 0.0006 ND	< 0.0001 ND	< 0.0003 ND	45	45
1,1,2,2-Tetrachloroethane	< 0.0002 ND	< 0.0001 ND	< 0.0002 ND	35	35
Vinyl chloride	< 0.0005 ND	< 0.0094	< 0.0004 ND	1 ppm	1 ppm
1,1-Dichloroethene	< 0.0005 ND	< 0.0001 ND	< 0.0004 ND		
trans-1,2-Dichloroethene	< 0.0004 ND	< 0.0001 ND	< 0.0003 ND		
cis-1,2-Dichloroethene	< 0.0004 ND	< 0.0001 ND	< 0.0003 ND		
Trichloroethene	< 0.0004 ND	< 0.0001 ND	< 0.0002 ND		
Tetrachloroethene	< 0.0508	< 0.0001 ND	< 0.0002		
1,2-Dichloropropane	< 0.0003 ND	< 0.0001 ND	< 0.0002 ND	350	350
cis-1,3-Dichloropropene	< 0.0003 ND	< 0.0001 ND	< 0.0002 ND		
trans-1,3-Dichloropropene	< 0.0004 ND	< 0.0001 ND	< 0.0004 ND		
Chlorobenzene	< 0.0003	< 0.0001	< 0.0001	350	350

VOLATILE ORGANICS, mg/dscm (cont'd)

NON-CHLORINATED COMPOUNDS	RUN 1	RUN 2	RUN 3	OSHA TWA PELS	ACGIH TWA PELS & OTHERS
Acetone	4.9088	< 0.1184	< 1.8749	2400	2400
2-Butanone	< 0.6108	< 0.0001 ND	< 0.0002 ND	590	590
4-Methyl-2-pentanone	< 0.0001 ND	< 0.0001 ND	< 0.0002 ND		
2-Hexanone	< 0.0003	< 0.0001 ND	< 0.0003 ND	410	410
Vinyl Acetate	< 0.0003 ND	< 0.0166	< 0.0600		
Carbon disulfide	< 0.0001	< 0.0008	< 0.0001 ND	20 ppm	60
Bromomethane	< 0.0047	< 0.0040	< 0.0006 ND		
Bromoform	< 0.0005 ND	< 0.0001 ND	< 0.0002 ND	5	5
Benzene	< 0.4253	< 0.0001 ND	< 0.0003 ND	10 ppm	0.5 ppm
Toluene	< 0.0003 ND	< 0.0107	< 0.0279	200 ppm	750
Ethylbenzene	< 0.0108	< 0.0023	< 0.0063	435	435
Styrene	< 0.0455	< 0.0067	< 0.0234	100 ppm	(C)420
m/p-Xylene	< 0.0407	< 0.0064	< 0.0203	435	435
o-Xylene	< 0.0304	< 0.0044	< 0.0160	435	435

< = Sum of multi-component concentrations is below detection limit.
ND = Not detected in any tube set or condensate for this run.

(C) designates a ceiling limit. They are to be determined from breathing-zone air samples.
ppm: may be converted to mg/m^3 by the following equation: mg/m^3 = ppm X mol. wt. compound / 24.0 (at standard condition: 68°F and 29.92 psi)

SEMIVOLATILE ORGANICS (MM5), mg/dscm

COMPOUNDS	RUN 1	RUN 2	RUN 3	OSHA TWA PELS	ACGIH TWA PELS & OTHERS
Hexachloroethane	< 0.00015 ND	< 0.00017 ND	< 0.00037 ND	10	10
Acenaphthene	0.00039 J	0.00016 J	0.00066 J		
Acenaphthylene	0.00081 J	0.00046 J	0.00206 J		
Anthracene	< 0.00004 ND	0.00008 J	0.00011 ND		[430][15]
Benz(a)anthracene	< 0.00004 ND	< 0.00005 ND	0.00027 J		
Dibenz(a,h)anthracene	< 0.00004 ND	< 0.00004 ND	0.00013 J		
1,2-Dichlorobenzene	< 0.00009 ND	< 0.00010 ND	< 0.00022 ND	(C)300	(C)300
1,3-Dichlorobenzene	< 0.00008 ND	< 0.00009 ND	< 0.00019 ND		
1,4-Dichlorobenzene	< 0.00008 ND	< 0.00008 ND	< 0.00020 ND	450	450
1,2,4-Trichlorobenzene	< 0.00009 ND	< 0.00009 ND	< 0.00022 ND		36[16]
Hexachlorobenzene	< 0.00011 ND	< 0.00013 ND	< 0.00032 ND		
Nitrobenzene	< 0.00007 ND	< 0.00008 ND	< 0.00019 ND	5	5
3,3'-Dichlorobenzidine	< 0.00010 ND	< 0.00011 ND	< 0.00015 ND	§1910.1007[a]	§1926.1107[a]
2,4-Dinitrotoluene	< 0.00017 ND	< 0.00019 ND	< 0.00045 ND	1.5	1.5
2,6-Dinitrotoluene	< 0.00019 ND	< 0.00020 ND	< 0.00050 ND	1.5	1.5
Naphthalene	0.03102 B	0.01547 B	0.01005 B	50	50
2-Chloronaphthalene	< 0.00005 ND	< 0.00006 ND	< 0.00014 ND		

[a] No concentration given.

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[15] LD_{50}: mg/kg oral, mouse

[16] TLV: mg/m^3 (Threshold Limit Value)

SEMIVOLATILE ORGANICS (MM5), mg/dscm (cont'd)

COMPOUNDS	RUN 1	RUN 2	RUN 3	OSHA TWA PELS	ACGIH TWA PELS & OTHERS
2-Methylnaphthalene	0.01603	0.01080	0.00938		[4360][2]
Phenanthrene	0.00032 BJ	0.00028 J	0.00021 BJ		[50][17]
Fluorene	0.00043 J	0.00020 J	0.00022 J	-	
Fluoranthene	0.00008 J	0.00013 J	< 0.00009 ND		[2000][6]
Benzo(b)flouranthenes	0.00049 J	< 0.00004 ND	< 0.00097 J	-	
Benzo(k)flouranthenes	0.00010 BJ	< 0.00005 ND	0.00019 BJ	-	
Pyrene	< 0.00004 ND	< 0.00004 ND	0.00009 J		[170][7]
Benzo(a)pyrene	0.00036 J	< 0.00005 ND	0.00044 J	coal	coal
Indeno(1,2,3-cd)pyrene	0.00022 J	< 0.00003 ND	0.00021 J	-	
Benzo(g,h,i)perylene	0.00038 J	0.00002 ND	0.00027 J	-	
Chrysene	< 0.00004 ND	< 0.00004 ND	0.00065 J	coal	200[1]
Dibenzofuran	0.00138 J	0.00043 J	0.00112 J		
Isophorone	< 0.00004 ND	< 0.00004 ND	< 0.00010 ND	140	140
Hexachlorobutadiene	< 0.00013 ND	< 0.00014 ND	< 0.00035 ND		
Hexachloropentadiene	< 0.00018 ND	< 0.00020 ND	< 0.00048 ND		
Butyl benzylphthalate	0.00049 BJ	0.00007 ND	0.00042 BJ		[2330][2]
Diethyl phthalate	0.00387 BJ	0.00209 BJ	0.00240 BJ		5[4]
Dimethyl phthalate	< 0.00004 ND	< 0.00005 ND	< 0.00012 ND	5	5
Di-n-butyl phthalate	0.00150 BJ	0.00491 BJ	0.00440 BJ	5	5
Di-n-octyl phthalate	0.00037 BJ	< 0.00004 ND	0.00027 BJ		[6513][5]
bis(2-Ethyhexyl)phthalate	0.00413 BJ	0.00462 BJ	0.00694 B	5	5
Benzoic acid	0.06074 B	0.03804 B	0.01327 B		[2530][10]
Benzyl alcohol	< 0.00016 ND	< 0.00018 ND	< 0.00040 ND		[4354][12]
2,2'-Oxybis(1-chloropropane)	< 0.00005 ND	< 0.00006 ND	< 0.00013 ND		
4-Bromophenyl phenyl ether	< 0.00015 ND	< 0.00018 ND	< 0.00046 ND		
bis(2-Chloroethyl)ether	< 0.00009 ND	< 0.00011 ND	< 0.00023 ND		
4-Chlorophenyl phenyl ether	< 0.00010 ND	< 0.00011 ND	< 0.00027 ND		
bis(2-Chloroethoxy)methane	< 0.00007 ND	< 0.00008 ND	< 0.00019 ND		
Phenol	0.03208 B	0.00914 B	0.00912 B	19	19
4-Chloro-3-methylphenol	< 0.00011 ND	< 0.00011 ND	< 0.00027 ND		
2-Chlorophenol	< 0.00008 ND	< 0.00010 ND	< 0.00021 ND		
2-Methyl phenol	0.00811	0.00076 J	< 0.00023 ND		22[13]

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[17] LD_{50}: mg/kg, oral, mouse

[6] LD_{50}: mg/kg, oral, rat

[7] LC_{50}: mg/m^3, rat

[2] LD_{50}: mg/kg, oral. rat

[4] TLV: mg/m^3 (Threshold Limit Value)

[5] LD_{50}: mg/kg, oral, mouse

[12] LC_{to}: mg/m^3 rat

[13] PEL for skin exposure

SEMIVOLATILE ORGANICS (MM5), mg/dscm (cont'd)

COMPOUNDS	RUN 1	RUN 2	RUN 3	OSHA TWA PELS	ACGIH TWA PELS & OTHERS
3/4-Methyl phenol	0.00370 J	0.00096 J	< 0.00023 ND		22[14]
2,4 Dichlorophenol	< 0.00010 ND	< 0.00011 ND	< 0.00026 ND		[580][2]
Pentachlorophenol	< 0.00018 ND	< 0.00022 ND	< 0.00056 ND	0.5	0.5
2,4,5-Trichlorophenol	< 0.00014 ND	< 0.00015 ND	< 0.00036 ND		
2,4,6-Trichlorophenol	< 0.00013 ND	< 0.00014 ND	< 0.00034 ND		
2-Nitrophenol	< 0.00016 ND	< 0.00017 ND	< 0.00041 ND		
4-Nitrophenol	< 0.00037 ND	< 0.00039 ND	< 0.00096 ND		
2,4-Dinitrophenol	< 0.00043 ND	< 0.00046 ND	< 0.00113 ND		
4,6-Dinitro-2-methylphenol	< 0.00024 ND	< 0.00029 ND	< 0.00073 ND		
2,4-Dimethylphenol	< 0.00009 ND	< 0.00010 ND	< 0.00023 ND		
4-Chloroaniline	< 0.00008 ND	< 0.00009 ND	< 0.00020 ND		
2-Nitroaniline	< 0.00014 ND	< 0.00016 ND	< 0.00038 ND		
3-Nitroaniline	< 0.00018 ND	< 0.00020 ND	< 0.00048 ND		
4-Nitroaniline	< 0.00023 ND	< 0.00025 ND	< 0.00061 ND	6	6
N-Nitrosodiphenylamine	0.00042 J	0.00078 J	0.00116 J		
N-Nitroso-di-n-propylamine	< 0.00011 ND	< 0.00013 ND	< 0.00028 ND		

PCDD/PCDF, ng/dscm	Run 1	Run 2	Run 3
PCDDs			
2,3,7,8-TCDD	2.42E-03	< 2.48E-03	< 1.56E-02
Other TCDD	0.00E+00	0.00E+00	1.22E-01
Total TCDD	2.42E-03	2.48E-03	1.38E-01
1,2,3,7,8-PeCDD	< 4.83E-03	< 6.21E-03	1.30E-02
Other PeCDD	7.25E-03	0.00E+00	6.49E-02
Total PeCDD	1.21E-02	6.21E-03	7.79E-02
1,2,3,4,7,8-HxCDD	< 2.42E-03	< 6.21E-03	< 2.60E-03
1,2,3,6,7,8-HxCDD	4.83E-03	< 3.11E-03	< 5.19E-03
1,2,3,7,8,9-HxCDD	< 7.25E-03	< 3.11E-03	< 7.79E-03
Other HxCDD	2.66E-02	0.00E+00	3.12E-02
Total HxCDD	4.11E-02	< 3.11E-03	4.67E-02
1,2,3,4,6,7,8-HpCDD	2.42E-02	9.32E-03	2.08E-02
Other HpCDD	2.90E-02	6.21E-03	#.12E-02
Total HpCDD	5.32E-02	1.55E-02	5.19E-02
OCDD	5.56E-02	2.17E-02	< 2.86E-02
Total PCDDs	< 1.64E-01	< 4.91E-02	< 3.43E-01
Sub-Total TEQ 2,3,7,8-TCDD	< 6.58E-03	< 6.95R-03	< 2.39E-02
PCDFs			
2,3,7,8-TCDF	2.03E-01	1.93E-01	3.35E+00
Other TCDF	1.22E+00	1.39E+00	2.78E+01
Total TCDF	1.43E+00	1.58E+00	3.12E+01
1,2,3,7,8-PeCDF	4.11E-01	2.30E-01	2.10E+00
2,3,4,7,8-PeCDF	2.66E-01	1.43E-01	1.45E+00
Other PeCDF	1.98E+00	1.21E-01	1.15E+01
Total PeCDF	2.66E+00	1.58E+00	1.50E+01
1,2,3,4,7,8-HxCDF	1.52E-01	6.83E-02	4.67E-01

[14]PEL for skin exposure

PCDFs (cont'd)

PCDD/PCDF, ng/dscm	Run 1	Run 2	Run 3
1,2,3,6,7,8-HxCDF	7.73E-02	3.42E-02	2.13E-01
2,3,4,6,7,8-HxCDF	4.83E-02	< 1.55E-02	1.48E-01
1,2,3,7,8,9-HxCDF	< 2.17E-03	< 3.11E-03	5.19E-03
Other HxCDF	3.00E-01	1.15E-01	1.01E+00
Total HxCDF	5.80E-01	2.36E-01	1.84E+00
1,2,3,4,6,7,8-HpCDF	< 5.32E-02	< 1.86E-02	1.12E-01
1,2,3,4,6,7,8-HpCDF	< 7.25E-03	< 3.11E-03	7.79E-03
Other HpCDF	0.00E+00	3.11E-03	3.90E-02
Total HpCDF	2.66E-02	< 2.48E-02	1.58E-01
OCDF	4.35E-02	1.24E-02	1.82E-02
Total PCDFs	< 4.73E+00	< 3.44E+00	4.82E+01
Sub-Total TEQ 2,3,7,8-TCDF	< 2.02E-01	< 1.15E-01	1.25E+00
Total TEQ 2,3,7,8-TCDF	**< 2.09E-01**	**< 1.21E-01**	**< 1.28E+00**

Results of R&D Studies
South Glen Falls Drag Strip, Moreau, New York
1995

1. Maxymillian Technologies, Inc. (MTI) submitted a TSCA (Toxic Substances Control Act) Research and Development Permit Application on June 2, 1995 to the Chemical Management Division (CMD) to test its mobile Indirect Source thermal desorption unit to remove PCBs from soil. MTI provided follow up submissions for clarification and detail on the R&D operations on June 23 and August 2, 1995 and the Work Plan dated September 15, 1995. Results of the studies are summarized in Item 7 below.

2. Process Description: The IDS process employs a continuous process which uses a rotating desorption chamber heated by an indirect source to desorb organic contaminants from soil. The IDS unit includes: (a) a material handling system connected to the IDS by a seal to preclude ambient air; (b) the Thermal Desorber which uses indirect heat provided by burners channeling hot gas through an annular space in the desorber shell, and © a treated soil discharge system which employs a seal to preclude ambient air from the chamber. Maxymillian claims that a non-oxidative atmosphere is maintained throughout the desorption chamber.

3. The gas treatment system cleans the gas stream exiting the desorber. The gas flows through a baghouse, a quench, pre-heater, HEPA filter and through a dual columns of adsorptive carbons, prior to discharging to the atmosphere. An Induced Draft fan maintains negative pressure throughout the IDS.

4. Because the IDS discharges carrier gas through dual columns of adsorptive granulated carbon, the integrity of the columns must be safeguarded. To ensure against channeling and breakthrough of the carbon bed, an organic compound(s) detected at the inlet of the carbon columns should be monitored for at the outlet of the primary column. Some possible organic compounds for which to be searched are listed below:

benzene
carbon tetrachloride
chloroform
methylene chloride
trichlorethylene

Periodic sampling of the inlet to detect any of the compounds above should be followed up by sampling the outlet of the primary column. Frequency of sampling shall be established using data developed during the demonstration.

5. Liquids from the quench unit are treated in the Water Treatment System. Filter waste products (filter cake) resulting from the treatment is disposed of (see Item 5 below). A final polishing

procedure purifies the water prior to discharge. The treated water provides cooling and moisturization of the treated soil discharged from the IDS desorption chamber.

6. At the South Glens Falls site, Maxymillian intends to test the filter cake as a recyclable feedstock conditioner, adding the filter residue to the feedstock. Recycling of the filter cake falls into the category of waste minimization. EPA may impose additional monitoring procedures and conditions during the time the recycle material is being treated.

7. R&D Test Results: A series of tests were performed under a TSCA R&D approval issued December 11, 1995. The tests were completed in January 1966 at the South Glens Falls Drag Strip site. Using a two-tiered approach, the initial tier focused on determining suitable operating conditions using soil containing PCBs less than 50 ppm. For the second tier, Maxymillian selected operating conditions appropriate for treating PCB contaminated soil and sampled and monitored process streams. The following tables summarized results of the tests.

TIER I OPERATIONS

Run No	Treated Soil Feed Rate, tph	Soil Exit Temp, °F	PCBs in Waste Feed, ppm	PCBs in Treated Soil, ppm	Chamber Draft, " w.c.	Quench Water pH
1	7.04	904.0	34.1	0.017	-0.388	8.32
2	8.00	842.2	19.8	0.012	-0.476	8.12
3	8.27	822.2	8.4	0.040	-0.469	6.82
4	6.95	690.2	8.5	0.083	-0.512	7.37
5	7.60	604.2	27.2	0.145	-0.462	6.37
6	8.36	540.0	16.5	0.566	-0.487	7.33
7	6.26	625.0	15.4	0.286	-0.847	*

TIER I OPERATIONS (cont'd)

Run No	Treated Soil Feed Rate, tph	Soil Exit Temp, °F	PCBs in Waste Feed, ppm	PCBs in Treated Soil, ppm	Chamber Draft, " w.c.	Quench Water pH
8	15.44	630.4	18.9	0.181	-0.570	8.77
9	12.37	582.9	10.8	0.036	-0.474	6.62
10	14.44	646.2	7.1	0.073	-0.467	7.66
10a	15.66	454.3	12.9	1.49	-0.490	9.14
10b	16.30	600.0	10.2	0.684	-0.267	7.17
10c	15.53	658.1	20.8	0.181	-	-

* pH probe malfunctioned

TIER II OPERATIONS:

Run No	Soil Feed Rate, tph	Treated Soil Exit Temp, °F	PCBs in Waste Feed, ppm	PCBs in Treated Soil, ppm	Chamber Draft " w.c.	Quench Water pH	Parti-culates, gr/dscf	HCl, lb/hr
1	6.97	880.8	29.0	0.023	-0.464	6.92	0.0024	4.16 E-04
2	7.02	887.0	18.1	0.010	-0.464	7.01	0.0070	5.01 E-04
3	7.20	650.4	(15.8)*	0.160	-0.477	7.17	NA	NA
4	8.13	644.0	(25.0)*	0.446	-0.495	7.16	NA	NA

* Calculated from R&D PCB soil feed rate in R&D Report

Run No	THC, ppmv	CO, ppm	CO_2, %v	O_2, %v	PCB Emission Rate g/sec	PCDD/PCDF Emission Rate g/sec	PCDD/PCDF TEF Emission Rate g/sec
1	169	1.1	9.5	11.8	8.79E-07	1.76E-06	2.64E-11
2	257	1.7	8.3	15.5	1.23E-06	5.15E-09	6.69E-11
3	12224	4.69	12.1	13.5	2.43E-07	< 3.86E-10	1.10E-09
4	17666	1.681	13.7	13.0	1.01E-06	< 1.26E-11	2.43E-11

Run No	PCB Stack Concentration µg/dscm	PCDD/PCDF Stack Concentration ng/dscm	PCDD/PCDF TEF Stack Concentration ng/dscm
1	14.1	34.6	0.52
2	18.2	195	2.53
3	3.76	< 11.1	< 0.318
4	17.3	37.5	0.722

PROCESS WATER RESULTS:

Date Processed	Volume, gallons	Influent PCB Level, µg/L	Effluent PCB Level, µg/L
12/18/95	7,945	263 (Total PCBs)	ND (0.5 MDL)
12/21/95	7,474	822	ND
1/2/96	5,303	524	ND
1/2596	7,097	92.1	ND